

Progress Toward the 1990 Objectives for Sexually Transmitted Diseases: Good News and Bad

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Synopsis

The problem of sexually transmitted diseases (STDs) in the United States has been growing, in both scope and complexity, at an alarming rate. As evidence of the emergence of these diseases as a primary national concern, the Surgeon General has designated them as 1 of 15 priority areas in which further actions are required to improve the health of the American people.

The key targets for the 1990 objectives for the nation in the STD area include reducing the incidence of gonorrhea; gonococcal pelvic inflamma-

tory disease; and primary, secondary, and congenital syphilis. This report updates progress toward these objectives. There is good news with respect to the continuing success of proven methods in preventing and controlling both gonorrhea and syphilis. However, the picture is less bright with respect to control of other STDs that have gained new prominence—Chlamydia, herpesvirus, human papillomavirus, and human T-cell lymphotropic virus type III infections.

Escalating interest in STDs reflects more recent appreciation of their relation to reproductive outcomes. STD organisms clearly have a far-reaching effect on the nation's population, including the capacity to reproduce, the rate of perinatal infection, the incidence of genital cancers, and the occurrence of acquired immune deficiency syndrome (AIDS).

Some major hurdles still must be faced before the 1990 objectives can be successfully met. The population at risk will remain large, fueling the STD epidemic and taxing existing resources. Public sector support may not keep up with inflation, much less keep pace with the expanding spectrum of sexually transmitted disease. From a public health vantage, however, the opportunities for further advances in controlling STDs have never been greater.

THE PROBLEM OF sexually transmitted diseases (STDs) in the United States has been growing at an alarming rate throughout the last two decades, creating an urgent need for action during the 1980s in both the public and the private medical sectors.

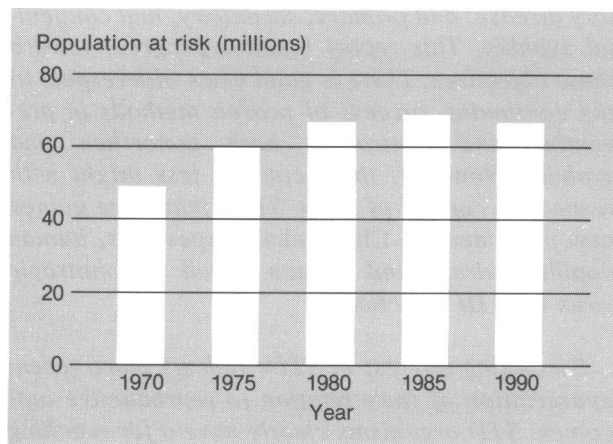
To provide a measure of progress, the Department of Health and Human Services in 1979 established national objectives for 1990 with respect to STDs (1). The objectives were designed to address important areas of concern and were based on a number of assumptions:

1. Stable sexual behavior patterns. The 1990 objectives assumed that factors in American society affecting the population at risk for STDs would not change. However, the size of the sexually active population at risk has never been larger than during

the 1980s. It has been estimated that the American population this year will include some 69 million sexually experienced persons between the ages of 15 and 34 (fig. 1), up from 42 million in 1970. A large number of female teenagers and single adults are initiating sexual activity at an earlier age, having multiple sex partners, and remaining single for a longer period of time (2–4), although this number appears to be stabilizing in the mid-1980s. These changes have placed increasing numbers of people at higher risk for contracting STDs, posing a major challenge to public and private medicine.

2. Stable public support for control of STDs. The 1990 objectives assumed that both Federal and State funds for STD control would at least remain constant, if not increase, during the 1980s; however, inflation and recessionary periods in the econ-

Figure 1. Sexually experienced population, age 15-34, United States, 1970-90



SOURCE: References 2 and 3.

omy have taken a toll. Thus far in the 1980s, public investments in traditional control efforts have not kept up with inflation, although this problem has been offset to some degree by the development of more cost-effective control measures. On the other hand, new national initiatives to control gonococcal pelvic inflammatory disease and penicillinase-producing *Neisseria gonorrhoeae* have been necessary, further diluting available funds (5).

3. Stable STD spectrum. The 1990 objectives assumed the primary importance of gonorrhea and syphilis; however, the late 1970s and early 1980s have seen an amazing expansion of knowledge about STD organisms and syndromes. New diagnostic approaches have identified the extent, method of transmission, and clinical consequences

of recently recognized STDs—particularly *Chlamydia*, herpes simplex virus, human papillomavirus, and human T-cell lymphotropic virus type III infections. Moreover, the true incidence of these infections has apparently increased, and a greater proportion of systemic diseases, as well, appear to be sexually transmitted. Finally, the key impact of STDs on maternal and child health is more apparent now than ever, and the tragic consequences of the acquired immune deficiency syndrome have captured national attention.

4. Delayed technological developments. The 1990 objectives assumed that some technological resources, related particularly to chlamydial and genital herpesvirus infections, would not be available early in the 1980s. Although these two types of infection are highly prevalent in our society, control efforts have awaited the arrival of a simple diagnostic technique for chlamydial infections (6) as well as an effective therapy for genital herpes (7). Now, however, it appears that potential solutions to both these problems are on the horizon.

Our initial progress report in this journal on the 1990 objectives with respect to STDs (8) reflected the assumptions just cited. Today, however, as already noted, (a) the population at risk is larger, (b) funds for control of STDs are shrinking, (c) the spectrum of STDs is expanding, and (d) prevention technology for some of the newly recognized STDs is available. Thus, priorities for STD control efforts are shifting (table), placing competing demands on available resources.

Sexually transmitted diseases with Federal prevention priority¹

Type of infection	Number of cases	Severity of consequences	Specific diagnosis	Treatment	Prevention methods
Gonorrhea	High	High	Inexpensive; available	Excellent	Proven
Syphilis	Moderate	Moderate	Inexpensive; available	Excellent	Proven
<i>Chlamydia</i>	High	High	Moderate cost; available	Very good	Being evaluated
Herpes	High	Moderate	Expensive; ² limited availability	Limited	Theoretical
Human papillomavirus	High	High	Inexpensive; available	Limited	Questionable
Human T-cell lymphotropic virus, type III ...	Moderate	Fatal	Inexpensive; available	None	Being evaluated

¹ As of February 1985, taking into account existing technology.

² Clinical diagnosis is useful, however.

In this report, we update progress toward attainment of the 1990 national objectives for control of STDs. There is good news with respect to the continuing success of proven prevention methods. However, the picture is less bright with respect to the newer STD organisms and the tradeoffs necessary to control them.

Progress Toward the Objectives

Of the 11 specific objectives for the nation established for the STD area in 1979, the 5 with highest priority from the Federal standpoint involved reductions in reported cases of uncomplicated gonorrhea, gonococcal pelvic inflammatory disease, and syphilis; increases in community awareness of STDs; and improvement in the diagnostic and treatment skills of STD clinicians (8). A statement of these five objectives and a description of the progress thus far in meeting them follow.

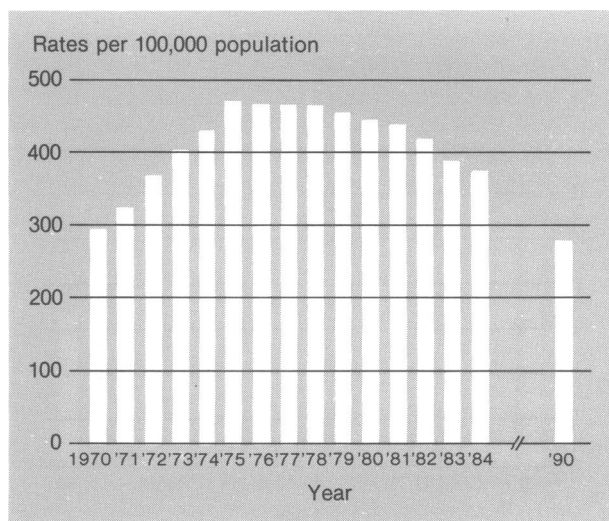
- Reported gonorrhea incidence should be reduced to a rate of 280 cases per 100,000 population.
- Reported incidence of gonococcal pelvic inflammatory disease should be reduced to a rate of 60 cases per 100,000 females.

The reported gonorrhea rate (which had increased approximately 12 percent annually between 1965 and 1975) continues its decline. In 1983, the gonorrhea rate per 100,000 population fell below 400 (fig. 2) for the first time since the national gonorrhea control initiative began in 1972 (9). Reported case rates for 1984 have accelerated this downward trend. On the basis of current projected annual decreases through the 1980s, it is estimated that approximately 650,000 cases of gonorrhea will be reported in 1990—a rate of 260 per 100,000 population that will meet the established 1990 goal.

Trends in gonococcal pelvic inflammatory disease (PID), reflecting the pattern of lower genital tract gonorrhea in females, suggest that the 1990 objective in this area will also be met. On the basis of projected annual decreases in gonococcal PID through the 1980s, it is estimated that approximately 55,000 cases will be reported in 1990—a rate of 43 cases per 100,000 females, which is substantially lower than the established 1990 goal of 60 cases per 100,000 females.

However, gonococcal PID may not be the major cause of salpingitis. Gonococcal PID predisposes women to repeated episodes of nongonococcal PID (10) that may occur several years after the initial

Figure 2. Gonorrhea case rates, United States, 1970-90



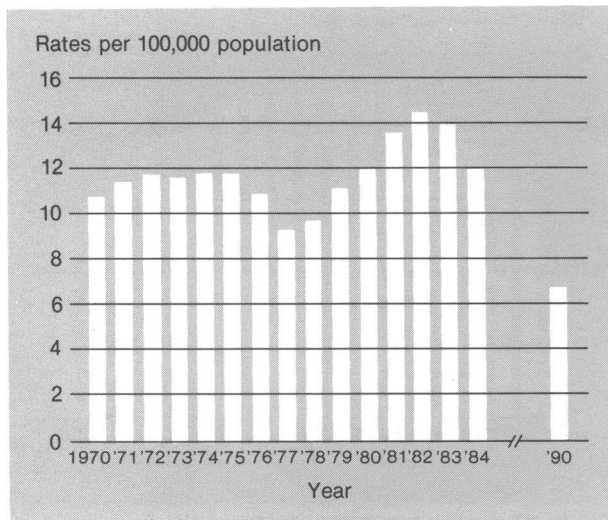
NOTE: The 1990 objective is a rate of 280 per 100,000 population.
SOURCE: Centers for Disease Control.

gonococcal infection. The overall effects of gonorrhea control programs on nongonococcal PID are undetermined at present. Although visits by PID patients to private physicians appear to have decreased (11), hospitalizations for PID have shown some recent increases, especially among young white women (12). Several factors could account for this apparent conflict. The overall number of visits to private physicians' offices for all health conditions declined over the past decade. Also, physicians may have been more likely to hospitalize patients with PID in recent years, as they have become more aware of the long-term consequences of this problem.

The national gonorrhea screening program would appear to be most effective in preventing initial, perhaps less severe, episodes of PID; episodes of chronic PID would be less likely to be affected by current control programs. While the incidence of gonococcal PID may be declining, that of PID due to *Chlamydia* and other microorganisms may be rising. Chlamydial infections are initially more indolent (13), thus leading to a greater delay in treatment and eventually to more severe PID.

The success of the gonorrhea control effort appears to be directly related to the infusion of Federal dollars. The amount of Federal funds committed to gonorrhea control at the State and community levels fluctuated slightly throughout the last 5 years. However, because of increased efficiency of the control strategies—targeted screening, more effective referral of sexual partners, and more rapid identification of asymptomatic carriers—the gonor-

Figure 3. Primary and secondary syphilis case rates, United States, 1970-90



NOTE: The 1990 objective is a rate of 7 per 100,000 population.
SOURCE: Centers for Disease Control.

rhea control effort has held its own (5). The number of reported cases began decreasing in the 1980s, despite increases in the population at risk and changes in behavioral patterns in U.S. society that would be expected to fuel the incidence of this disease.

- Reported incidence of primary and secondary syphilis should be reduced to a rate of 7 cases per 100,000 population per year, with a reduction in congenital cases to 1.5 cases per 100,000 in children under 1 year of age.

The major decreases in reported cases of syphilis over the last 35 years indicate a true STD success story. Yet, from 1977 to 1982, the number of reported cases of early infectious syphilis increased markedly (fig. 3). This created concerns among public health officials; however, in 1983 the number of these reported cases leveled off—the first year since 1976 in which no increase was recorded (14). Data for 1984 showed a 10 percent decrease in the number of reported cases, compared with the 1983 total. On the basis of current projected annual decreases through the 1980s, it is estimated that approximately 22,000 cases of primary and secondary syphilis will be reported in 1990—a rate of 8.8 per 100,000, somewhat higher than the target goal of 7 cases per 100,000.

Congenital syphilis is the most important sequela of this infection. The incidence of congenital syphilis is directly influenced by the amount of infectious syphilis in the female adult population. As a result, the key to prevention of congenital syphilis

lies in prevention and control of early infectious syphilis among women in the childbearing years. Pregnant women with the infection who are identified through an effective screening system and treated early for their illness will not bear congenitally infected children.

Control of congenital syphilis in the 1980s, like control of other sexually transmitted diseases, requires the efforts not only of STD clinicians but also of other health care providers who interact with patients at high risk of infection. Several approaches are necessary:

1. A comprehensive national surveillance system, designed to collect in-depth data on every possible case of congenital syphilis, should be instituted. Analysis of such data will indicate where to focus program efforts with the greatest likelihood of success.
2. Health care providers serving high-risk populations need to be sensitized to the problem of congenital syphilis. Available data indicate that a majority of women who bear children with congenital syphilis have not had adequate prenatal care (15). These women generally are young and usually come from disadvantaged groups that depend on public health facilities for their medical care. Medical professionals, especially those in health service agencies that relate to such patients (for example, migrant health clinics, neighborhood health centers, free clinics, family planning agencies, and maternal and child health centers), must establish and maintain a high level of awareness of congenital syphilis. These professionals are potentially valuable allies in promoting early and regular prenatal care services for the hard-to-reach woman.
3. Creative educational programs must be developed to reach pregnant women at highest risk of infection. In 1984, the Centers for Disease Control (CDC) made special demonstration funds available to State and local areas to improve community education efforts directed toward pregnant women and to reduce the potential for neonatal STD complications, particularly those related to congenital syphilis.

Data for 1984 reflect an increase in the incidence of congenital syphilis. Although such a fluctuation might occur because of the small number of cases involved (fig. 4), it probably reflects expanded surveillance and detection potential in key areas such as California, Florida, and Texas. On the basis of projected increases in reported cases in 1985 (because of increased surveillance) and potential de-

creases in subsequent years, it is estimated that approximately 90 cases of congenital syphilis will be reported in 1990—a rate of 2.2 cases per 100,000 live births, higher than the 1990 target of 1.5 cases per 100,000 live births.

- Every junior and senior high school student in the United States should receive accurate, timely STD education.

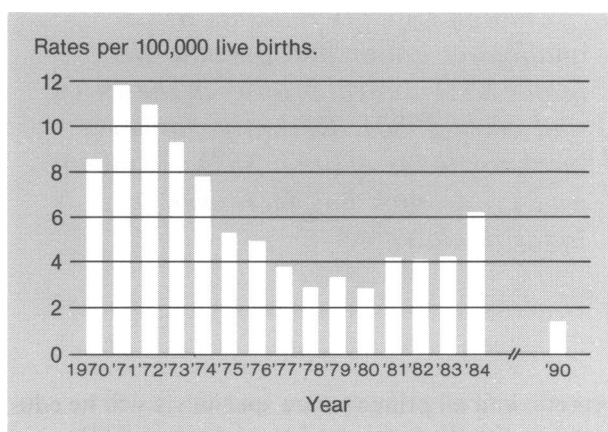
While many high school students receive some introduction to the subject of sexually transmitted diseases (16), the typical curriculums used to teach them come from outdated “venereal disease” days. Movies on tertiary syphilis are shown in physical education classes; didactic lectures, with slides on penile ulcers and discharge, emphasize biological facts. These approaches have been unsuccessful in equipping students with the knowledge and skills necessary to prevent acquisition and transmission of the more recently recognized STDs.

In 1983, about one-third of respondents in a survey of a representative national sample of teenagers considered themselves “very” informed on sexually transmitted diseases. Nearly half considered themselves “somewhat” informed (Gallup Institute Youth Survey, conducted January-March 1983, unpublished data). To overcome this ignorance and to meet the spirit of the 1990 objectives, new educational strategies must emphasize health promotion messages geared to behavior modification. Skills in decisionmaking to reduce risks can be developed. Awareness of the adverse future consequences of STDs can be dramatized by having students develop their own reproductive life plans; the role of STDs in jeopardizing the ability to have children would be highlighted. In this area, CDC has developed prototype school curriculum materials to facilitate introduction of behaviorally oriented STD information into health education curriculums in schools throughout the country. Student and teacher guides are currently being prepared for publication. Marketing and distribution of these materials are projected for 1986.

- At least 95 percent of health care providers seeing cases should be capable of diagnosing and treating all currently recognized STDs.

An integral part of STD control strategies in the United States has been to develop a coordinated system for training medical and paramedical health care providers in the rapidly changing STD field. CDC implemented the STD Prevention/Training

Figure 4. Congenital syphilis case rates, United States, 1970-79.



NOTE: The 1990 objective is a rate of 1.5 cases per 100,000 live births.
SOURCE: Centers for Disease Control.

Center concept in 1979 to address the growing need to improve diagnostic and therapeutic skills of clinicians directly involved in the management of STD patients (17). At each of the 10 centers, a university medical school and a model public STD clinic combine to provide this training. In fiscal year 1983, 82 courses were held, providing skill development for more than 1,700 participants. Approximately 8,000 clinicians have received this training since 1979.

While these centers have constituted an important first step in training health care practitioners, a more fundamental need exists to reach clinicians during their initial formal training. Medical school curriculums in the United States, however, have not kept pace with the widening spectrum of sexually transmitted disease, creating a dearth of clinicians with the necessary skills to diagnose, treat, and prevent these illnesses. Unfortunately, we appear to be going backward with respect to this objective: surveys of medical schools conducted in 1974 and 1981 showed that the number of teaching hours related to STDs actually dropped from 8.2 hours in 1974 to 6 hours in 1981 (18,19). The 1981 survey also indicated that only 22 percent of medical residency programs offered any training in this area.

In 1984, CDC supported special training demonstration programs at several key medical schools. These grants assisted medical schools in developing appropriate STD curriculums to serve as prototypes for other training institutions. This effort will also require liaison between the faculty members and the local STD clinic. Over time, a cadre of STD specialists will evolve to form the academic nucleus for clinical STD training in a number of medical

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centers, and all primary care specialists will be educated in the diagnosis and treatment of STDs.

The Challenge of Other STDs

Chlamydia, herpes simplex virus (HSV), human papillomavirus (HPV), and human T-cell lymphotropic virus type III (HTLV-III) infections pose a new challenge for public health officials. Although prevention of each of these four conditions warrants priority concern in the 1980s, each problem requires additional technological evaluation, as well as public financial support, before full-scale control programs can be initiated.

Chlamydial infections. Chlamydial infections have replaced gonorrhea and syphilis as the number one bacterial STD problem in the United States. An estimated 3 million cases of nongonococcal urethritis and related chlamydial infections occur in the United States each year (13). The clinical spectrum for these infections is almost identical to that of gonorrhea, even though the symptoms of chlamydial infection are more indolent and the sequelae more severe. Tubal scarring from chlamydial pelvic inflammatory disease, however, is probably the leading cause of involuntary infertility and ectopic pregnancy in this country. In addition, chlamydial infections pose a sizable risk of transmission to newborn infants and contribute to poor pregnancy outcome (13).

National efforts to control chlamydial infections have awaited the development of inexpensive diagnostic techniques. Until recently, the expense of laboratory processing and the difficulty of handling chlamydial cultures have been major problems restricting widespread use of diagnostic laboratory procedures by STD clinics. Now, however, two new diagnostic tests for chlamydial infection (6,20) have been developed and marketed; they await final

evaluation for sensitivity, specificity, and predictive value when used outside of research settings. The availability of these tests will eventually permit rapid, inexpensive detection of chlamydial infections in large-scale screening of women and men.

Demonstration projects are currently permitting STD programs to assess the impact of detecting, treating, and tracing chlamydial infections in their communities. CDC funded four State health departments in 1984 to conduct intensive evaluation of basic disease intervention techniques, identify high-risk factors and groups, and refine control strategies pertinent to *Chlamydia*. These initiatives will provide the necessary information for implementing full-fledged *Chlamydia* control programs at the national, State, and local levels.

Meanwhile, phase I of the *Chlamydia* control effort has begun, using short-term intervention strategies based primarily on lessons drawn from traditional STD control efforts. These activities include (a) treating all men and women with symptoms or signs of chlamydial infection and ensuring that their sex partners are simultaneously treated; (b) providing epidemiologic treatment for these infections to certain high-risk groups of patients, such as those with gonococcal infections; (c) creating public awareness of the problem through appropriate education programs; (d) enhancing professional recognition of the problem by incorporating knowledge about chlamydial infections in medical education programs; and (e) supporting research and demonstration projects that will yield the necessary information for long-term programs.

HSV and HPV infections. Infections caused by herpes simplex virus and human papillomavirus are also epidemic in the United States; yet, to date, the incidence and prevalence of these infections have been determined by few prospective community studies. Public health concern about HSV and HPV infections stems in part from the lack of effective therapy, the risk of transmission of these infections to sex partners and to infants born through an infected birth canal, and the epidemiologic association of these infections with cervical cancer.

Although control of genital HSV infections has been hampered by the lack of an effective antiviral drug, acyclovir is the first agent that may decrease episodes of clinical manifestation of genital herpes and thus interrupt transmission of the virus (7). Use of oral acyclovir in the treatment of this disease has recently been approved by the Food and Drug Administration, and its proper role in herpes control efforts needs evaluation.

Studies have shown that acyclovir reduces shedding of HSV and shortens the duration of lesions. The widespread use of oral acyclovir as prophylaxis to suppress recurrence of outbreaks carries the potential for public health benefit; however, its continual usage carries risks of viral resistance and drug toxicity. Thus, this antiviral agent must be carefully monitored, in large numbers of people over extended periods, for adverse effects. This monitoring would permit evaluation of the possibilities of carcinogenesis, mutagenesis, teratogenesis, and development of resistant strains of HSV.

Human papillomavirus infections represent the newest STD prevention priority. HPV infections occur at least three times as frequently as HSV infections. Moreover, increasing data associating HPV (especially subtypes 16 and 18) with genital cancers are raising public health concern (21).

Although efforts to control HPV infections remain on the distant horizon, the first step will soon be taken. CDC is supporting the development of effective antigen detection systems that not only will assist in determining the prevalence of HPV infections but also will provide information on normal patterns of transmission of various HPV subtypes and the relationship of these subtypes to cervical dysplasia.

HTLV-III infections. The acquired immune deficiency syndrome (AIDS) was not recognized until 1981, 2 years after the original 1990 STD objectives had been established. One of the major public health successes of this decade has been the scientific documentation of the epidemiology and etiology of this tragic condition. HTLV-III has been implicated as the causative agent in AIDS (22), and sexual transmission is the primary route of viral spread. The prevention and control of AIDS remains the nation's number one public health challenge.

Prevention recommendations have been offered by the Public Health Service to reduce the risk of acquiring or transmitting HTLV-III infections. These include (23,24):

1. Sexual contact should be avoided with persons known to have or suspected of having AIDS, including those who use intravenous drugs.
2. Multiple sexual partners or sex with a person who has multiple sexual partners increases the possibility of acquiring AIDS.
3. Certain sexual practices, especially those that involve damage to the rectal lining, may be associated with increased risk of acquiring AIDS. Al-

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though its effectiveness has not been demonstrated, use of condoms has been suggested as a means of preventing spread of the disease by sexual intercourse.

4. Cases of AIDS among persons using intravenous drugs could be reduced by measures to discourage drug addiction and the practice of needle sharing.
5. All members of groups at increased risk for AIDS should voluntarily refrain from donating plasma and blood.
6. Physicians should adhere strictly to medical indications for transfusions, and autologous blood transfusions are encouraged.

Recently, an enzyme immunoassay test for HTLV antibody was released by the Food and Drug Administration (24). The test has been recommended initially as a tool for testing blood donations. Alternate testing sites are being planned in both the public and private sectors so that members of risk groups who wish to be tested will not donate blood simply to learn if they are positive. Members of AIDS risk groups should continue to refrain from donating blood.

Future Tradeoffs and Networking

Although syphilis remains a challenge, gonorrhea became the major STD control priority in the 1970s and early 1980s. Recently, however, our knowledge of other STD organisms and syndromes has increased at a logarithmic rate. New technological methods promise to make feasible the control of some of these disease problems. The availability of nonculture techniques for diagnosing chlamydial infections will undoubtedly lead to expansion of the national control program. Effective oral antiviral agents will promote efforts to control genital herpes.

'If necessary, STD program managers will have to make some decisions about tradeoffs in disease control, limiting activities devoted to some traditional diseases and redirecting these resources to meet public health needs in new priority disease categories.'

STD programs throughout the country will have to increase the cost-effectiveness of intervention approaches to stretch available resources. If necessary, STD program managers will have to make some decisions about tradeoffs in disease control, limiting activities devoted to some traditional diseases and redirecting these resources to meet public health needs in new priority disease categories.

To gain further leverage on the widening objectives of STD control, program administrators will have to rely on the spectrum of public and private agencies interested in controlling genital infections. STD program managers, trained to coordinate activities of clinical, laboratory, and community institutions, already have an instinct for networking. These nets must be cast even wider, to include communication with colleagues in maternal and child health, primary care, family planning, occupational health, and other disciplines not traditionally aligned with communicable diseases.

Within the Public Health Service, CDC, as the lead PHS agency for attainment of the 1990 objectives with respect to STDs, must coordinate (a) STD diagnostic and treatment regimens with the Health Resources and Services Administration, (b) STD research with the National Institutes of Health, (c) evaluation of STD therapies with the Food and Drug Administration, (d) STD data collection with the National Center for Health Statistics, and (e) STD screening programs with the Office of Population Affairs.

The Health Resources and Services Administration has many components delivering direct health care to populations at high risk for STDs. Such units as the Indian Health Service and the Bureau of Health Care Delivery and Assistance are particularly essential. The programs of Maternal and Child Health, Migrant Health Centers, Community Health Centers, and the National Health Service Corps each play a key role. Currently, HRSA components operating throughout the country are de-

veloping service guidelines and standards to include patient education, diagnosis, and treatment for STDs.

The National Institutes of Health supports a broad variety of basic science, clinical, and epidemiologic projects dealing with nearly all the STDs. At present, emphasis is given to research on gonococcal and chlamydial infections and on herpes simplex virus, human papilloma virus, and human T-lymphotropic retroviruses. NIH also sponsors training of postdoctoral fellows in clinical and microbiological STD research and has undertaken periodic workshops to provide updates on the most rapidly advancing areas of STD knowledge.

The Food and Drug Administration regulates the availability of important new antibiotics and vaccines for use against STDs. The development of new drugs to combat antibiotic-resistant organisms is crucial. Moreover, the recent licensure of oral acyclovir for genital herpes will also require that FDA and CDC monitor any long-term consequences of this antiviral agent.

The National Center for Health Statistics has been the primary agency responsible for defining patterns in reproductive behavior throughout the United States. Through collaboration with CDC, NCHS has provided the best estimates of the increasing population at risk for STDs.

Finally, the Office of Population Affairs is responsible for administering Federal family planning grant programs. Because these programs serve a target group of sexually active young women, they have a key role to play in STD control and will be crucial in implementing initial screening efforts for *Chlamydia* control programs.

Outside the PHS, CDC must continue to stimulate and encourage STD efforts among such supportive professional organizations as the American Medical Association, the American Academy of Family Practice, and the American College of Obstetricians and Gynecologists. Cooperation among the wide array of agencies interested in controlling STDs will allow development of an integrated program devoted to overall reproductive health.

Conclusion

The increased attention directed to sexually transmitted diseases by patients, health care providers, researchers, policy makers, and the general public is both exciting and challenging. This escalating interest reflects more recent appreciation of the relation of STDs to both reproductive outcomes and

chronic illnesses. The organisms that cause these diseases clearly have a far-reaching effect on the nation's population, including the capacity to reproduce, the rate of perinatal infection, the incidence of genital cancers, and the occurrence of acquired immune deficiency syndrome.

Some major hurdles must still be faced before the 1990 objectives can be successfully met. Vaccines for most STDs are far from successful application, and such technology is unlikely to contribute to attainment of any of the 1990 STD objectives. The population at risk will remain large, fueling the STD epidemic and taxing existing resources. Public sector support may not keep up with inflation, much less keep pace with the expanding STD spectrum. Program efficiencies must be improved, and important tradeoffs must be made. Despite this, the opportunity for making further advances against STDs has never been greater.

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